



Network Simulator Software

About PacketStorm Communications, Inc

PacketStorm Communications, Inc. was founded in November 1998 by a group of engineers from the prestigious Bell Laboratories.

PacketStorm develops, manufactures, and supports high end testing solutions for the Internet Protocol (IP) communications market. PacketStorm is the market leader for advanced IP Network Emulators with dynamic and traffic conditioning emulation. PacketStorm sells test solutions through a global network of independent representatives and international distributors.

Network emulation with data rates up to 10 Gbps

Network Emulators

The PacketStorm IP Network Emulators and simulators reproduce the unfavorable conditions of IP Networks and WANs in a controllable and repeatable lab setting. PacketStorm is the Industry leader of Layer 2 and Layer 3 WAN emulation and network bandwidth simulation.

Video Test Solutions

PacketStorm has developed products to address the video application test requirements. Products provide network emulation, capture video files, replay video files, and replicate video streams. These products have a number of unique video application features such as: DASH dynamic network emulation, FEC Aware network emulation, Hitless network emulation, large capture and replay files, and video server farm stream emulation. Video applications include: DASH, FEC, Hitless/Seamless Protection, Video Generation/Replication, and Video Transport.

Network Emulation

The Internet, private wide area networks, and cloud services represent some of the aspects that connect the user to their application. As users demand faster response and more complex data from their applications, the networks carrying this data are under greater pressure to meet these expectations. To truly test out applications before rolling it out to the users, network emulation must be used. Network emulation is also referred to as wan emulation.

Network emulation is used by manufacturers, service providers, and applications developers to verify the robustness of their network product or application. A wan emulator recreates the real world effects seen in the network. Standard features of a network emulator include filtering, impairments, modifiers, and routing.

Filtering allows the wan emulator to separate traffic into different groups to represent different networks. Therefore, a network emulator emulates multiple network scenarios between two emulator ports. Even though end devices are only feet apart and connected to the same server through the emulator, device “A” and device “B” could be viewed to be on different sides of the world by the server.

Network Simulation

Network simulation covers a wide range of different concepts. However, there are two main network simulation concepts: a software program simulating the interaction of network devices and equipment to simulate a network with real data.

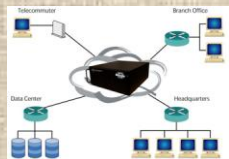
The network simulation software is to test the end to end application behavior on different network designs. Again the network simulation is done completely in software.

The other network simulation is to test application performance with real data. Even though it is more accurate to call real data testing as network emulation, most people still refer it as network simulation.

Some examples of network simulation include: enterprise networks, satellite networks, networks with remote data centers, service provider networks, networks with cloud based elements, and application based networks such as video delivery services.

Just as testing with actual real data vs. software provides a closer alignment to “real network” testing, testing with live traffic vs. synthesized data gets even closer. Network devices operate differently depending on the interaction with the traffic. It is common to see a router affect live traffic differently than synthesized video traffic and therefore it is best to get as close as possible to the real network to ensure all issues are fully tested and reduce deployment risk.

Products



PacketStorm Communications has a product list that includes IP network emulators, stream replicator, capture & replay system, and network recording devices.

Network Emulators

Typical uses include WAN emulation and network simulation for Enterprises, network devices, and software applications. The family of IP network emulators ranges from the Tornado software to the 60 Gbps PacketStorm6XG. Most of the hardware IP network emulators and the PSCapture software have network recording capabilities.

Each IP network emulator is designed for a particular application. The Tornado software emulator addresses low bandwidth and simple network applications. The PacketStorm200E emulator provides network emulation in a portable chassis. The

PacketStorm1800E emulator addresses multiple 10/100 Mbps and legacy interface applications. The PacketStorm400E, Hurricane II, and Hurricane III are designed for Gigabit applications.

Stream Generator/Replicator

The product accepts up to 48 input streams and replicates them exactly with different header information to make thousands of unique streams. Load and stress test network and access equipment with real video not synthetic video traffic. Eliminates the need for large number of servers or encoders to generate high capacity video. Replicated streams are treated just like streams from real encoders and servers. Many switches and routers are video aware and need to be tested with real video traffic.

Capture & Replay System (CRS)

The CRS is focused at the video market to capture large files and replay them. The PacketStorm CRS is a packet capture and replay system with hardware time stamping at 10Gbps. The user specifies which packets to capture based on the filter parameters. The CRS file management includes automatic file compression and decompression. Operation is via the console or the remote GUI.

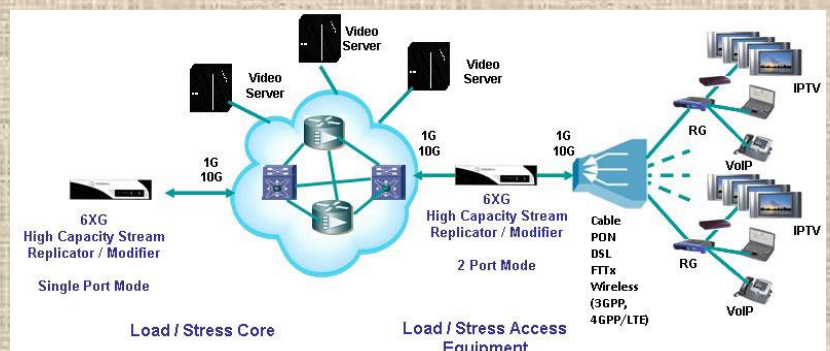
Network Recording

PacketStorm's network recording captures the network characteristics which can be transferred and replayed in a PacketStorm hardware emulator. PSCapture software provides real time graphs and histograms as the network characteristics data is being captured.

6XG Stream Replicator & Modifier

Features

- Easy-to-use GUI
- Line Rate 1G or 10G
- Up to 48 Input Streams
- Up to 4000 Output Streams
- Sequential or Non-Sequential Addresses
- Maintain Original Stream's Characteristics
- Replicate Live Streams
- Modify Source & Destination Addresses & Ports
- Modify MAC & VLAN
- Recalculate CRC, IP, & UDP/TCP Checksums
- Automatic Multicast MAC Address Calculation



- IGMP v2 & v3 Join/Queries

Applications

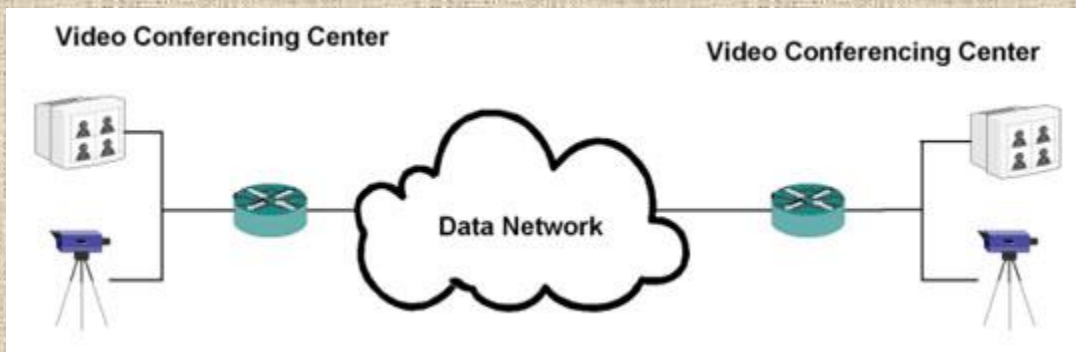
- Emulate Large Video Farm
- Modify Live Video Stream Addresses
- Stress Test QAM Gateways
- Stress Test DSLAMS

The PacketStorm6XG High Capacity Stream Replicator generates any kind of streams. Probably the biggest application is to generate video streams. To generate streams, the 6XG replicates one or more input video streams and outputs up to 4000 video streams.

Applications

Video

Video over IP applications have soared in popularity over the last five years. Companies have increased their video conferencing usage as a means to reduce travel expenses, speed up the lead time needed to hold critical meetings, and offer investors access to high level board meetings. Traditional phone service providers are rushing to provide video services as a way of locking in customers and increasing revenues. Cable TV operators have been steadily upgrading their analog systems to offer consumers enhanced digital services. All of these applications focus on delivering digital video content over data services. As these video services evolve from luxuries and novelties to commodities and everyday expectations, video IP equipment vendors and service providers are scrambling to establish themselves as the dominant players in this maturing industry.



In addition to high bandwidth, high quality video must overcome the imperfect world of IP networks. There is another very important factor that must be designed for: the imperfect world of IP networks. Network impairments are expected in IP communications. Network delays, dropped packets, traffic congestion, reordered packets, fragmented packets, and duplicated packets are all facts of life in IP communications. Many higher level protocols such as TCP are designed with error correction mechanisms to ensure that data is moved nearly error free from point to point. TCP dictates that endpoints resend packets when

errors are encountered, and application delays may incur because of this, but most likely the correct information will eventually be delivered and the application can operate as it should. Video streaming and other real time IP applications can't afford the overhead time associated with error correction protocols, and typically rely on UDP protocols. VoIP also uses UDP protocols, and is subject to similar network impairment problems. Although it can be an annoying experience to use VoIP service with poor quality, humans can negotiate their own 'error correction'. "Sorry, I didn't hear that last statement. Could you repeat that?" IP video does not have the luxury of higher level or human intervention error correction. It is subject to the most demanding endpoint of all; the human eye and human visual experience.

Testimonials

Nuasis needed serious testing equipment... and chose PacketStorm.

"Nuasis NuContact Center is the IP based contact center solution manufactured by Nuasis Corporation in Mountain View, CA. This totally IP-based multimedia offering provides Nuasis' customers a highly reliable and scalable architecture to manage multiple sites as if they were one large call center. Nuasis Corporation relies on PacketStorm Communications' network emulation test tools to ensure the quality of their products."

PacketStorm test equipment a key component of business success

"As a professor at Penn State and also a key principal in a private data networking consulting form, it is absolutely essential that the tools that Dr. Phil Hippensteel relies on are accurate and reliable. Dr. Hippensteel relies on PacketStorm Communications test equipment for his network emulation requirements."

LeftHand Networks uses PacketStorm for Disaster Recovery scenarios

"LeftHand Networks uses PacketStorm's IP Network Emulators in our test lab to simulate repeatable WAN conditions, allowing us to reliably profile real-world customer Disaster Recovery scenarios. Our test engineers and developers consider the PacketStorm solution an essential tool for network transport analysis, which in turn helps us provide LeftHand customers a better open iSCSI SAN solution with accurate performance characterizations."

Randy Hollis, Vice President of Engineering, LeftHand Networks.

For more information please visit

<http://www.packetstorm.com>